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Gender differences in insulin resistance during adolescence: a longitudinal study (EarlyBird)

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Gender differences in insulin resistance during adolescence: a longitudinal study (EarlyBird)

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Background and aims: The risk of type 2 diabetes is increasing significantly in teenage girls and this may be explained by their greater insulin resistance (IR). Cross-sectional studies reveal that IR is higher in prepubertal girls than boys, although adult males have higher IR and diabetes risk. Longitudinal studies into this gender difference (GD) are scarce. Our hypothesis was that the intrinsic gender difference in IR would persist from childhood through adolescence. Materials and methods: Longitudinal cohort of 292 children (147 boys) studied annually from 9-16y (EarlyBird Study). Measures: IR (Homeostasis model assessment-2), % body fat (dual energy x-ray absorptiometry), pubertal stage (age at peak height velocity; APHV), physical activity (accelerometry). Cross-sectional univariate analyses and multi-level modelling were used to establish influence of covariates and age-related trends in IR. Results: Unadjusted age-related trends in IR are shown in Fig 1a. Girls were 21-63% more insulin resistant than boys between 9 and 15y (mean IR in boys ranged from 0.51 (CI 0.47-0.57) to 0.89 (0.81-0.98), girls from 0.73 (0.66-0.80) to 1.33 (1.20-1.47), p0.07). At 16y, boys were 30% more insulin resistant than girls (boys 0.63 (0.56-0.72), girls 0.44 (0.38-0.51), p=0.001). Conclusion: The adolescent gender difference in IR is predominantly explained by adiposity, with smaller effects of pubertal timing and activity, thus we reject our hypothesis. A divergence occurred around the age of 16 years when males became more insulin resistant than females. These findings may explain the changing female to male predisposition to type 2 diabetes between childhood and adulthood.